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MISSISSIPPI RIVER WATER TEMPERATURES AT NEW ORLEANS

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Temperatures of Mississippi River water, being of interest in water treatment, are recorded on about 5 days each week at the Carrollton Purification Plant. A quart sample is taken from the influent to the grit reservoirs; although this sampling point is about three quarters of a mile distant from the intake, calculation indicates that, because of the insulation afforded by the earth cover, no appreciable change in temperature of the water occurs during travel through the 48-inch low-lift main. No high degree of accuracy is claimed for the data, however, since readings have been made with various thermometers, and by many different individuals having a wide range of personal equations. Observational errors are probably greatest under winter conditions when cold water samples are brought into a warm laboratory; postponing the reading of a thermometer, in such a case, for 5 minutes may cause a positive error as large as 2° F.

Monthly average temperatures for the 24-year period 1915–38, inclusive, are given in table 1, and are plotted in the accompaning figure; abscissae are at the midpoints of the months.

The average monthly air temperatures for a 68-year period, obtained from Weather Bureau tables, are also plotted in the figure. The minimum air temperature is reached much sooner in winter than the minimum water temperature; however, in summer, the air-temperature maximum is reached only a few days before the water-temperature maximum. Points of intersection of the two curves, in early July and early December, divide the year into a long interval of over 7 months, early in the year, during which the average air temperature is greater than that of the river water, and a short period of almost 5 months during which the river water is slightly warmer than the air. Since the river flows southward from a generally colder region it can readily be understood how the winter water temperature is below local mean air temperature; but the fact that the water temperature in midsummer is higher than local air temperatures is more difficult of interpretation. The following factors are suggested: (1) Sampling is done at midday, and errors caused by postponed readings increase the temperature of the sample according to the prevailing noon summer temperature; (2) during stream flow, water temperature is increased directly by solar radiation, and this factor is capable of accounting for a temperature rise of approximately 9° in July, if insolation is estimated at 500 gram-calories per square centimeter per day.

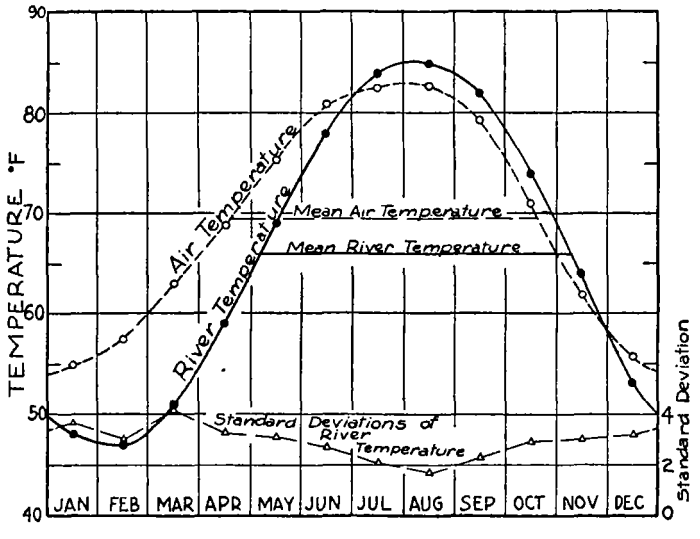

TABLE 1.—*Monthly average Mississippi River water temperatures at New Orleans. ° F.*

Month	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938	Average	Standard deviation
January	43	46	47	48	47	49	53	48	46	46	43	46	45	43	47	47	46	54	51	48	48	47	60	47	48	3.7
February	45	45	46	51	46	50	52	45	45	43	44	46	47	44	46	47	48	55	50	49	46	43	50	50	47	3.0
March	43	44	55	58	52	51	60	49	50	44	49	49	50	47	48	52	51	55	54	50	54	51	54	57	51	4.2
April	57	55	61	63	62	60	64	63	60	52	61	54	53	55	62	57	56	60	60	59	62	58	60	62	59	3.3
May	78	66	67	70	67	67	70	71	68	67	66	63	69	64	68	71	66	70	73	71	69	72	70	72	69	3.1
June	79	75	77	82	76	77	82	79	77	75	71	78	79	76	75	77	77	81	79	80	76	82	81	79	78	2.7
July	81	79	81	83	87	83	88	83	82	82	86	83	83	82	83	84	84	85	83	86	82	85	85	84	84	2.1
August	82	83	85	85	89	86	88	84	84	85	85	85	86	83	84	82	83	87	84	86	87	86	86	85	85	1.7
September	77	80	80	82	82	84	87	83	80	80	85	83	86	82	81	81	82	82	84	81	80	86	83	83	82	2.3
October	70	70	72	73	83	74	74	75	72	73	80	69	72	75	74	75	77	72	74	75	74	75	74	74	74	2.9
November	65	61	61	66	67	65	67	66	57	66	63	58	63	67	64	64	68	62	63	66	65	59	59	64	64	3.0
December	51	50	54	61	50	54	55	55	52	54	51	51	52	53	50	54	60	51	59	50	51	53	49	50	53	3.2
Average	65	63	65	69	64	67	70	63	64	64	65	64	65	64	66	66	67	69	68	67	66	66	68	67	66	1.8

The maximum difference between air and water temperatures, amounting to slightly over 10° F., occurs at the time of minimum river temperature in mid-February; in summer the largest difference (in the opposite direction) is only about 2.5° F. The water temperature curve is the more symmetrical; river temperatures, owing to the great bulk of the water mass, naturally exhibit a smoothed effect of the factors influencing the seasonal temperature variation. The river temperature curve is closely a sinus soidal wave, having nearly a 2-month lag in its minimum and approximately a 1½-month lag in its maximum behind the winter and summer solstices, respectively.